

2. On the Heart of *Apteryx*. By F. E. BEDDARD, M.A.,
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The structure of the heart of *Apteryx* has been described somewhat fully by Sir Richard Owen in his well-known memoir upon the anatomy of the Southern Apteryx¹; this account is illustrated by two figures, one of which represents the heart in its entirety viewed from the right side, while the other is a view of the same region of the heart, with the wall of the right ventricle removed in order to display the structure of the right auriculo-ventricular valve.

The description given of the right auriculo-ventricular valve is as follows:—

“The principal deviation from the ornithic type of the structure of the heart is represented in the valve at the entry into the right ventricle (pl. lii. fig. 3). This is characterized in birds by its muscularity and its free semilunar margin. In the *Apteryx* it is relatively thinner and in some parts semitransparent and nearly membranous; a process moreover extends from the middle of its free margin, which process is attached by two or three short *chordæ tendineæ* to the angle between the free and fixed *parietes* of the ventricle. We perceive in this mode of connection an approach in the present bird to the mammalian type of structure analogous to that which the *Ornithorhynchus*, among Mammalia, offers, in the structure of the same part, to the class of birds; for the right auriculo-ventricular valve in the *Ornithorhynchus* is partly fleshy and partly membranous.”

The figure which illustrates this description is entirely in harmony with it, but does not at all represent the structures observable in the hearts of *Apteryx* that I have myself studied.

In a heart of *Apteryx australis*, which I found among the Prosector's stores, the right-auriculo-ventricular valve is composed of two halves which unite together at a point nearly opposite the auriculo-ventricular aperture, and are connected there by a muscular flap to the dorsal (free) wall of the ventricle. The right half is the larger and arises chiefly from the free wall of the ventricle, partly, however, from the septum and from the point of union of the septum with the free wall; it is of uniform thickness and muscular throughout. The left half of the valve is considerably smaller; it arises from the inter-ventricular septum and from the septum between the ventricle and the auricle; like the right valve, it is muscular throughout with the exception of a very minute membranous portion lying at the lower side of the valve; this portion of the auriculo-ventricular valve is not of uniform appearance like the left, but is formed

¹ Trans. Zool. Soc. vol. ii. p. 272.

of a number of closely united fleshy columns. Just before the junction of the left half of the valve with the muscular flap already described two minute *chordæ tendineæ* connect it with the free wall of the ventricle between the attachments of the left half of the valve and the free muscular flap; the two are fused almost immediately after their origin, and form a single excessively small fibrous band which is attached to a papillary muscle.

I can find no trace of the *chordæ tendineæ* that Sir R. Owen figures arising from the lower margin of the valve and inserted towards the hinder end of the ventricular cavity; the only structure at all similar is the slender fibrous band which I have described as connecting the valve with the free wall of the ventricle; this structure does not appear to me to be the same for reasons which I shall put forward in describing the heart of *Apteryx oweni*. With regard to the valve itself, it is not in my specimen "in some parts semitransparent and nearly membranous;" the thickness of the valve, which, except for a small portion on the left half is entirely muscular, is by no means less than that of any other bird with which I have had the opportunity of comparing it; the very slight development of membrane on the left half of the valve close to its origin is clearly a matter of no importance, since I have found this same feature to be more marked in *Eupodotis* and in other birds. In short, my heart of *Apteryx*, as well as a specimen in the possession of Prof. Lankester, which he kindly allowed me to inspect, and another preserved in the Oxford Museum, present no differences of any importance from the hearts of other birds.

Of the heart of *Apteryx oweni* I have been able to examine two examples, in both of which the right auriculo-ventricular valve has much the same structure. It only differs from that of *A. australis* in the presence of a stout muscular band arising from the septal wall of the ventricle and attached to its free wall close to the fleshy bridge which unites the free margin of the valve to the ventricular wall; it gives off a short branch to the latter. This structure closely corresponds to the "moderator band" described by Prof. Rolleston in the heart of the Cassowary; the *chordæ tendineæ* which I have described in the heart of *A. australis* probably represent the upper portion of the moderator band of *A. oweni*.

I have examined a large series of hearts of birds with a view to discovering if there were any deviations from the normal type in the right auriculo-ventricular valve, but I can find none; the only differences at all are in the left-hand portion of the valve, which is more or less membranous, and in a specimen of *Eupodotis australis* appears to be entirely so. Gegenbaur, however, speaks of a rudimentary septal flap in *Sarcorhamphus*¹.

¹ Jen. Zeitschr. Bd. ii. p. 380.